USAAVNS PT 133

PROGRAMED TEXT

ILS PROCEDURE

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UNITED STATES ARMY AVIATION SCHOOL
FORT RUCKER, ALABAMA

DEPARTMENT OF THE ARMY
UNITED STATES ARMY AVIATION SCHOOL
FORT RUCKER, ALABAMA

PROGRAMED TEXT

TITLE: ILS Procedure

SCOPE: Interpretation of and compliance with ILS approach charts. Interpretation of the course selector during an ILS approach. Use of runway visual range.

INSTRUCTOR'S REFERENCE: TM 1-225

MATERIAL REQUIRED: USAAVNS Ground School Copy - Approach Charts

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PREPARED BY: American Institutes for Research, Pittsburgh, Pennsylvania — DATE: January 1967

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CONTENTS

PREFACE

This program will take the student through a typical ILS approach using the FLIP approach chart for Tallahassee Muni Airport.

In addition to discussing all phases of the approach in sequence, the program introduces the topic of Runway Visual Range (RVR). At many airports, equipment is installed to determine the range of visibility looking down the runway from the approach end. Controllers include prevailing RVR data in the information relayed to pilots who may then apply it to published RVR minima in lieu of conventional visibility minima.

This program supplements instruction on ILS presented in USAAVNS PT 131 which should be completed prior to this program.

ILS PROCEDURE

PROGRAM OBJECTIVES

At the of this program, the student will be able to—

1. Given an ILS approach chart, state all procedures required during the applicable approach, from transition to visual contact or missed approach.

2. Given an approach plate with RVR values, and samples of reported ceiling and visibility, state the minimums which would apply if he were making the approach.

FRAME 1

Refer to the ILS Runway 36 Approach Chart for Tallahassee Muni as necessary throughout the program.

The approach fix is located in the center of an ILS approach chart. The radio facility at Tallahassee Muni used as the ILS approach fix is the _____.

FRAME 26

What two indications show you are over the LOM inbound?

a. _____.

b. _____.

1a.

Answer: outer marker (OM)

26a.

Answer: Marker beacon passage
Reversal of No. 1 needle of the RMI } either order

FRAME 2

From over the Greenville VOR, you could go to the outer compass locator by flying outbound on the _____ radial for _____ miles at a minimum altitude of _____ .

FRAME 27

The distance from the outer marker to the middle marker is _____, and the distance from the middle marker to the field is _____.

2a.

Answer: 243

33

1800 feet

27a.

Answer: 3.5 NM

.6 NM

FRAME 3

A transition is a published course, minimum altitude and distance from an outer fix to an approach fix. Clearances from outer fixes to the approach fix will normally be based on the published transition, except that traffic conditions may require assignment of a higher

_____ .

FRAME 28

The lower right corner of the approach charts shows speed/time data to use for flight from the approach fix to the field.

The time to the field will be—

For 70 knots _____ .

For 125 knots _____ .

3a.

Answer: altitude

28a.

Answer: 3 minutes and 31 seconds

1 minute and 58 seconds

FRAME 4

Transitions may also be from intersections and nondirectional beacons.

The transition from Creek Intersection is—

Minimum altitude _____ .
Course _____ .
Distance _____ .

FRAME 29

Approximately how long will it take to fly the 4. 1 miles at 90 knots?

_____(interpolate).

4a.

Answer: 1800 feet

074°

15 NM

29a.

Answer: 2 minutes and 44 seconds

FRAME 5

The three items of information which a published transition includes are—

a. _____ .

b. _____ .

c. _____ .

FRAME 30

Near the front of the FLIP Instrument Approach Procedures Charts is a rate-of-descent chart. If the glide slope is 2.6°, and the final approach speed is 70 knots, your rate of descent is _____ fpm. At Tallahassee the ILS glide slope is _____°; if the final approach speed is 90 knots, what rate of descent will be used? _____ fpm. (interpolate)

GROUND SPEED (knots)	ANGLE OF DESCENT (degrees and tenths)							
	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4
70	250	275	300	325	350	370	395	420
80	285	310	345	370	400	425	455	480
90	320	350	380	415	445	480	510	540
100	355	390	425	460	495	530	565	600
110	390	430	465	505	545	585	625	660

5a.

Answer: Minimum altitude
Course
Distance
} any order

30a.

Answer: 325

2.50

400 (rounded-off)

FRAME 6

Transition to the ILS final approach may be accomplished by radar vectoring. In such cases, the radar controller may ignore published transitions in order to expedite traffic and align the aircraft on final for straight-in approach eliminating procedure turn. In any event, the pilot should study the approach chart to become familiar with the published _____; but, the actual flightpath to the approach fix (or final) will comply with the _____.

FRAME 31

At faster approach speeds, your rate of descent will be—

☐ more.

☐ less.

6a.

Answer: transition

clearance

31a.

Answer: ☑ more

FRAME 7

Shortly before beginning an ILS approach, you must tune the ARN-59 (ADF) receiver to the _____ and the ARN 30 (VHF nav) receiver to the _____. However, in the case of the transition from Greenville VOR to the Tallahassee OM, the distance is _____ miles. Is the compass locator reliable for that distance? _____. Would the localizer signal be of any use to you in the early part of this transition? _____. When beginning the transition, you would tune the ARN 30 to _____. When would you tune it to I-TLH? _____.

FRAME 32

If you are using a glide slope receiver, your minimums for this approach are—fixed wing, _____; rotary wing, _____.

You may not descend below _____ feet MSL unless you have established _____.

7a.

Answer: compass locator

localizer

33

No (Reliable up to 15 miles.)

No (Useful when nearing the localizer course.)

GEF

Prior to reaching the LOM

32a.

Answer: fixed wing, 200-1/2; rotary wing, 200-1/4

261

visual contact with the runway environment

FRAME 8

Shortly before reaching the LOM while making the transition from Greenville VOR, you will tune the ILS localizer and the outer compass locator. Since the LOM consists of two facilities - the compass locator and the marker beacon - you must also check the power/volume of the _____ receiver.

FRAME 33

If you had to circle for a landing on another runway, the approach minimums would be—

CATEGORY "A"

	Ceiling	Vsby
F/W		
R/W		

8a.

Answer: marker beacon

33a.

Answer:

	Ceiling	Vsby
F/W	400	1
R/W	400	1/2

FRAME 9

The frequency of the I-TLH localizer is _____ .

The compass locator frequency is _____ .

FRAME 34

If you had to make a missed approach, what would you do?

_____

_____

_____ .

9a.

Answer: 110.3 MHz

379 kHz

34a.

Answer: Climb to 2,000 feet on the north course of the ILS and proceed to the TLH VORTAC. Also, request further clearance for another approach or to the alternate.

FRAME 10

The published glide slope frequency is _____.

However, in many aircraft, including certain Army aircraft, one tuning operation of the localizer frequency on the VHF NAV tuning head will automatically tune both localizer and glide slope receivers. On other Army aircraft, there may be a separate tuning head for the glide slope receiver; but it will display localizer frequencies since they are always paired with designated glide slope frequencies. Even for separate glide slope tuning, you would still set up a frequency of _____.

FRAME 35

Occasionally, the missed approach procedure will be more complicated than the one at TLH. Refer to the Cairns AAF ILS approach chart. The missed approach procedure requires the pilot to proceed to _____ Intersection and _____ .

The holding pattern shown for Hartford is _____ (standard/nonstandard).

10a.

Answer: 335.0

110.3

35a.

Answer: Hartford

hold

standard

FRAME 11

For a normal ILS approach, the pilot must insure that the following four receivers are on—

a. _____.

b. _____.

c. _____.

d. _____.

FRAME 36

After entering the holding pattern at Hartford, you would keep your VOR receiver tuned to the Dothan VOR because _____

_____.

11a.

Answer: Localizer

Glide slope

Compass locator (ADF)

Marker beacon

} any order

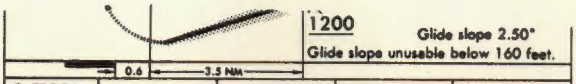
36a.

Answer: the holding course is on the 230° radial of the Dothan VOR

FRAME 12

For a typical ILS approach the minimums are 200 1/2. If the glide slope transmitter is inoperative, or if the aircraft is not equipped with a glide slope receiver, straight-in localizer minimums (S-LOCALIZER) are published. If you make an ILS approach at TLH for Runway 36 without a glide slope receiver, your minimums will be—

Fixed wing, _____; rotary wing, _____ .



CATEGORY	A	B	C	D
S-36	261-½ 200 (200-½)			
S-LOCALIZER 36	440-½ 379 (400-½)			440-¾ 379 (400-¾)
CIRCLING	460-1 379 (400-1)	540-1 459 (500-1)	540-1½ 459 (500-1½)	640-2 559 (600-2)

FRAME 37

Assuming you kept your VOR tuned to Dothan, you could best identify the Hartford Intersection by using _____

_____ .

12a.

Answer: fixed wing, 400 - 1/2

rotary wing, 400 - 1/4

NOTE: Visibility minimums may be reduced 50 percent for helicopters but in no case below one-fourth mile. Reference AR 95-2.

37a.

Answer: the No. 1 needle of the RMI to show a bearing of 330°

to the Cairns outer compass locator

FRAME 13

The MDA for the S-LOCALIZER approach at TLH is _____;

the HAA is _____ .

FRAME 38

Since there are no radials or bearings to locate accurately the point abeam the fix, you would roll out on the outbound leg after

_____

_____.

13a.

Answer: 440

379

38a.

Answer: carefully timing your 180° turn at exactly 1 minute

FRAME 14

On an ILS approach, you normally will refer to the S-ILS (straight-in ILS) minimums, but you may have to use the higher S-LOCALIZER minimums if _____ or _____.

FRAME 39

A preferred method of indicating minimums for precision approaches (ILS and PAR) is use of Runway Visual Range, usually abbreviated to its initials and called _____.

14a.

Answer: The glide slope is inoperative or, the aircraft does not have a glide slope receiver.

39a.

Answer: RVR

FRAME 15

The published ceiling and visibility minimums for the ILS approach without glide slope to Runway 36 at Tallahassee Muni are _____ feet and _____ mile(s).

FRAME 40

RVR gives the range of visibility actually available on the runway itself. RVR stands for _____.

Since RVR (in feet) is a preferred method of reporting visibilities and indicating minimums, a published RVR minimum (in feet) should be used where possible instead of _____.

15a.

Answer: 400 feet

1/2 mile

40a.

Answer: Runway Visual Range

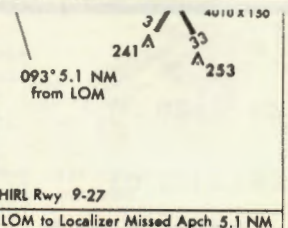
prevailing visibility (in miles)

FRAME 16

You are over the Tallahassee VORTAC at 3000 feet when you receive the following clearance from Tallahassee approach control. "Army seven one two one one is cleared from present position to the Tallahassee LOM for an ILS approach." On what course would you depart from "... Tallahassee VORTAC _____."

CATEGORY	A	B	C	D
S-ILS 9	468/24 250(300-½)			
S-LOC 9	560/24 342(400-½)			560/40 342(400-¾)
CIRCLING	620-1 399(400-1)	680-1 459(500-1)	680-1½ 459(500-1½)	780-2 559(600-2)

Night operations not authorized Runway 15-33.
Tower 987 8 NM East and tower 999 6 NM NE.



HIRL Rwy 9-27

LOM to Localizer Missed Apch 5.1 NM					
Knots	70	100	125	150	165
Min:Sec	4:22	3:04	2:27	2:02	1:51

ILS RWY 9 32°18'N-86°24'W MONTGOMERY, ALABAMA
68 DANNELLY FIELD

FRAME 41

RVR values are published on approach charts in the table of minimums. The RVR value for a straight-in ILS approach with glide slope at Dannelly Field is _____, and without glide slope is _____ ft.

RVR minimums are normally published for straight-in approaches with or without glide slope. However, Army Regulation 95-2 prohibits the use of RVR minimums with a _____ type approach.

16a.

Answer: 175°

41a.

Answer: 24 (2400 ft)

24 (2400 ft)

circling

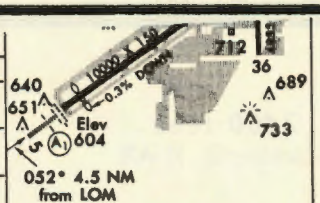
FRAME 17

The minimum transition altitude from the TLH VORTAC to the LOM is _____ . Since you have been cleared for the approach, you may begin descent from 3000 _____ _____ . When leaving 3000 feet you are required to _____ .

FRAME 42

CATEGORY	A	B	C	D
S-ILS 5	804/24 200 (200-½)			
S-LOC 5	1000/24 396 (400-½)			1000 /40 396 (400-¾)
CIRCLING *	1240-1 597 (600-1)		1240-1½ 597 (600-1½)	1240-2 597 (600-2)

* Circling not authorized in sector 050° clockwise through 180° from airport. Localizer unusable below 2800 beyond 15 NM, unusable below 3500 beyond 25 NM.



052° 4.5 NM from LOM

HIRL Rwys 5-23 and 18-36

LOM to LOC Missed Apch 4.5 NM					
Knots	70	100	125	150	165
Min:Sec	3:51	2:42	2:10	1:48	1:38

ILS RWY 5

33°34'N-86°45'W

37

BIRMINGHAM, ALABAMA

BIRMINGHAM MUNI

The RVR value gives the horizontal visibility on the approach end of the runway expressed in hundreds of feet. The minimum RVR for a straight-in at Birmingham Municipal is _____ .

17a.

Answer: 1800 feet

any time after receiving approach clearance
(Note: Procedure turn altitude is lower than minimum transition altitude. Upon reaching the LOM further descent to procedure turn altitude will be necessary.)

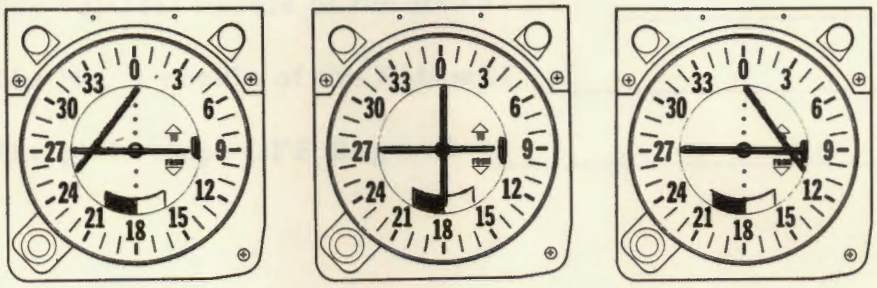
report leaving 3000 feet

42.

Answer: 2400 feet

FRAME 18

En route from Tallahassee VORTAC to the Tallahassee LOM, you tune the localizer and glide slope receivers. The course indicator looks like diagram _____.



a b c

FRAME 43

Prevailing Visibility	RVR Equivalent
1/4 mile	1600 feet
3/8 mile	2000 feet
1/2 mile	2400 feet
5/8 mile	3200 feet
3/4 mile	4000 feet
7/8 mile	4500 feet
1 mile	5000 feet
1 1/4 mile	6000 feet

AR 95-2 provides for conversion of visibility to RVR equivalents. RVR 24 is the same as _____mile, and 3/4 mile is equivalent to RVR _____.

18a.

Answer: C

Note: The transition course (175°) is west of the inbound localizer back course (180°). Therefore, the needle should be deflected to the yellow sector as indicated on the chart.

43a.

Answer: 1/2 mile

RVR 40

FRAME 19

As you pass the LOM, —

The marker beacon receiver will _____

_____.

The vertical needle of the ID 453 will _____.

The No. 1 needle of the RMI will _____.

The glide slope OFF flag will _____.

FRAME 44

RVR 50 is the same as a visibility of _____. The equivalent of 1-1/4 miles visibility is _____.

(Refer to last frame if necessary.)

19a.

Answer: give signal of continuous dashes - panel light and tone.

center

reverse

disappear (the GS OFF flag remains visible until a good signal is being received)

44a.

Answer: 1 mile

RVR 60

FRAME 20

From the LOM, you proceed outbound on a course of _____°. During the outbound flight, you should let down to a minimum altitude of _____. At this altitude you are _____ (above/below) the glide slope and the horizontal needle on the course indicator will be deflected (up/down) _____.

FRAME 45

Approach control may give you an RVR value even though the airfield has no published RVR. In this case, you must know the RVR equivalents in order to _____ _____,

20a.

Answer: 178°

1300 feet

below

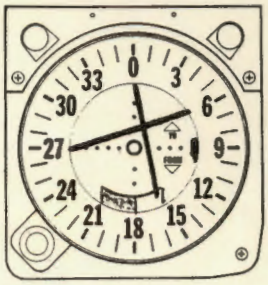
up

45a.

Answer: • convert RVR to visibility in miles

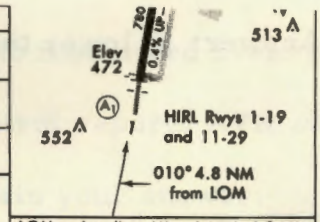
FRAME 21

While you proceed outbound, the deviation indicator shows if you drift into the blue or yellow sectors. The indicator below shows you are in the _____ sector which is _____ (east/west) of the localizer beam.



FRAME 46

CATEGORY	A	B	C	D
S-ILS 1	672/18 200 (200-½)			672/20 200 (200-½)
S-LOC 1	900/24 428 (500-½)			900/40 428 (500-¾)
CIRCLING	980-1 483 (500-1)		1140-1½ 643 (700-1½)	1140-2 643 (700-2)



LOM to Localizer Missed Apch 4.8 NM					
Knots	70	100	125	150	165
Min:Sec	4:07	2:53	2:18	1:55	1:45

ILS RWY 1

38° 11'N-85° 44'W
208

LOUISVILLE, KENTUCKY
STANDIFORD FIELD

If an airfield has published RVR data, it becomes the authorized minimum visibility, even though it may be lower than other published visibility minima in miles. For Sandiford Field, the published RVR values are—

- ☐ lower than
- ☐ the same as
- ☐ higher than

} the published visibility in miles.

21a.

Answer: yellow

west

46a.

Answer: ☑ lower than (the published visibility in miles)

FRAME 22

As in most approaches, your procedure turn for this approach should be within _____ NM of the approach facility. When you start your turn, you would turn _____ to a heading of _____ and fly for _____ seconds, approximately.

FRAME 47

Assume you are making an ILS approach to Standiford Field (see minimums on previous frame). Approach control reports RVR 20. May you start your approach? _____ Explain your answer. _____

_____

_____

22a.

Answer: 10

left

133°

40

47a.

Answer: Yes

The reported RVR is above the published RVR, even though it is below the published visibility converted to RVR

NOTE: Helicopters are still entitled to a 50 percent visibility reduction—but not lower than one fourth mile, or RVR 1600 feet.

FRAME 23

As you complete your procedure turn and begin to reintercept the final inbound course, you should track inbound on a course of _____.

FRAME 48

Army Regulation 95-2 provides that a straight-in approach may be started if the reported visibility or RVR is equal to or above the appropriate visibility minimum - EVEN THOUGH THE CURRENT CEILING IS BELOW MINIMUM CEILING.

At Standiford Field, (see Frame 46) if the current weather is 100 overcast, RVR 20, could you accept clearance to start a straight-in approach? _____

However, once the approach is started, you may not descend below _____ feet MSL unless you have established _____ with the runway environment.

23a.

Answer: 358°

48a.

Answer: Yes

672 feet MSL

visual contact

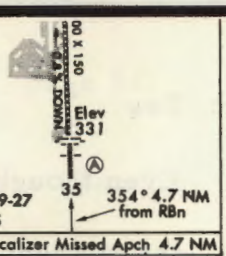
FRAME 24

While proceeding inbound, only minor localizer corrections should be made because of the sensitivity of the needle. The total approximate width of the beam that can be read on the instrument is _____ degrees. Although the course indicator needle represents a maximum of 10-degree deflections when used with VOR radials, the maximum ILS deflection from center to either side is only _____ degrees.

FRAME 49

CATEGORY	A	B	C	D
S-ILS 35	531/18 200 (200-½)			531/20 200 (200-½)
S-LOC 35 *	780/40 449 (500-¾)			
CIRCLING	780-1 449 (500-1)	800-1 469 (500-1)	800-1½ 469 (500-1½)	900-2 569 (600-2)

* Increase localizer minimum visibility ¼ mile for inoperative ALS and HIRLs; inoperative component table does not apply to ALS and HIRLs.



RBn to Localizer Missed Apch 4.7 NM					
Knots	70	100	125	150	165
Min:Sec	4:02	2:49	2:15	1:53	1:43

ILS RWY 35 35°04'N-89°58'W 180

MEMPHIS, TENNESSEE
MEMPHIS INTERNATIONAL

Reported RVR may be substituted for reported visibility. Memphis approach control reports conditions as 400-1/2, RVR 40. Are you authorized to start an ILS approach without glide slope?

_____. Explain your answer. _____

_____

_____.

24a.

Answer: 5 degrees

$2\frac{1}{2}$ degrees

49a.

Answer: Yes

Even though the current ceiling is below minimums and the current visibility in miles is below minimums (for fixed wing), the reported RVR is 40 which is equal to the RVR minimum of 40. For helicopters, the reported RVR could have been as low as 20 and still have been adequate to <u>start</u> the approach. The pilot may not go below the minimum authorized ceiling on final unless he establishes visual contact and can complete the landing visually.

FRAME 25

The approach chart shows that you will intercept the glidepath

☐ before you cross the LOM.

☐ after you cross the LOM.

☐ at the LOM.

Interception is indicated by _____ .

Turn to Performance Check, page 51.

25a.

Answer: at the LOM

the horizontal needle centering

Return to page 1, Frame 26.

PERFORMANCE CHECK #16

ILS

Name _____ Class _____ Score _____

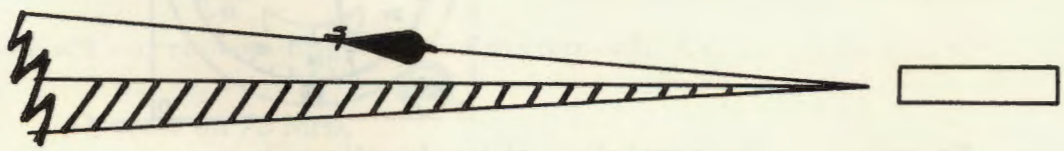
1. ILS localizer transmitters broadcast in the frequency range from _____ to _____ MHz on the _____ tenths of MHz.

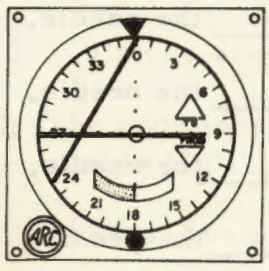
2. The letters of the code identifier broadcast by the localizer transmitter at Tyndall Air Force Base (PAM) are _____.

3. The ILS localizer beam is _____ degrees to _____ degrees wide, and you could reasonably expect to receive a reliable signal within _____ miles of the airport.

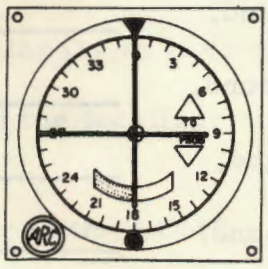
4. Which instrument indication is correct for the aircraft shown? (Check block.)

☐ A ☐ B ☐ C

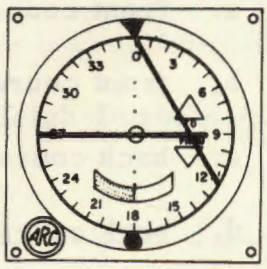




A



B

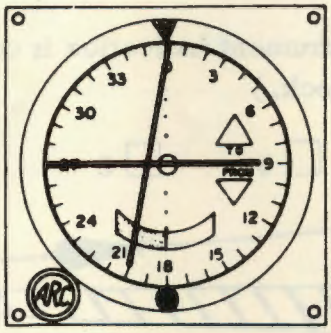


C

5. Check all correct endings to this statement: On the ARN-30A receiver, changing the switch from the OMNI position to the VAR LOC position—

- ☐ Disconnects the course selector.
- ☐ Disconnects the TO-FROM indicator.
- ☐ Disconnects the antenna.
- ☐ Increases the vertical needle sensitivity.
- ☐ Activates the glide slope receiver.

6. You are inbound on the front course of an ILS localizer and notice this instrument indication. To return to centerline, you should turn _____ (right/left).



7. To return to the centerline of the localizer beam

when you are on the—	you should turn (toward/away from)	
a. front course inbound,	_____	the needle.
b. front course outbound,	_____	the needle.
c. back course inbound,	_____	the needle.
d. back course outbound,	_____	the needle.

8. A typical glide slope elevation is an angle of about ____°.

9. To return to the glide slope, you should adjust your rate of descent so as to fly _____ (toward/away from) the horizontal needle.

10. In order to stay on the glide slope after interception, the pilot of a UH-1 cruising at 70 knots should use a rate of descent of about ____ fpm.

11. In an ideal installation, the outer marker is ____ miles from the approach end of the runway, and the middle marker is ____ miles from the approach end of the runway.

12. As a general rule, when making an ILS front course approach, you should begin final descent about the time you cross the _____. Execute missed approach, if necessary, about the time you cross the _____.

13. Describe the two indications of marker beacon passage that the pilot receives.

	Outer Marker		Middle Marker
a.	_____	a.	_____
b.	_____	b.	_____

14. Check all correct endings to this statement: Compass locators—

- ☐ Operate on 75 MHz.
- ☐ Are located at the site of a marker beacon.
- ☐ Are a low-frequency, nondirectional beacon.
- ☐ Can be used as a standby in case of marker beacon failure..

NOTE: The code identifier of the localizer at the Raleigh-Durham Airport is IRDU.

15. a. What is the identifier of the LOM? _____

b. What is the identifier of the LMM? _____

16. A compass locator has an effective range of about ____ miles.

17. Approach lights usually extend back from the approach end of the runway for a distance of _____ miles.

18. Check any of the following facilities which are usually capable of voice transmissions:

☐ VOR station. ☐ ILS glide slope.

☐ ILS localizer. ☐ Marker beacon.

NOTE: Use the Cairns ILS Runway 6 approach plate to answer the following questions:

19. The localizer is identified by _____ and broadcasts on a frequency of _____.

20. The approach course is _____.

21. The frequency of the outer compass locator is _____.

22. The minimums for a straight-in ILS approach are _____.

23. If the glide slope transmitter is not working, the minimums are _____.

24. Your approach speed is 75 knots. How long after passing the outer marker should you execute a missed approach, if necessary?

_____.

25. What is the published transition from the Hartford Intersection to the LOM? _____.

CHECK ANSWERS WITH YOUR INSTRUCTOR.